MARKED SPECIFICATION

F-8662

Electrooptical element

Background of the Invention

The invention relates to a generic electrooptical element ~~in accordance with the preamble to the main claim~~ for the purpose of installation in an electrooptical modulator (EOM), e.g. Pockels cell, with a housing, with the crystal arranged therein as a vertical cylinder, e.g., circular cylinder or cuboid, whose two cover surfaces form a front plane for a light beam to enter and an exit plane arranged at a distance therefrom and against each of which an annular electrode is placed, and with a holder provided between the housing on one side and both the lateral surface of the crystal and the two annular electrodes on the other side.

Such elements are known. Since all crystals in electrooptical elements have piezoelectric effects, during periodic changes to the applied electrical field the elements demonstrate mechanical elongations, that is, natural oscillations at natural frequencies – so-called piezo resonances –, which cause an additional change in the optical density and during the transmission of the electrical control signal overlay the phase of the light beam, which is very undesirable.

Summary of the Invention

The object of the invention is to reduce these natural oscillations.

This object is inventively attained, in a generic electrooptical element ~~in accordance with the preamble to the main claim~~ by its ~~characterizing~~ features in that the holder comprises an O-ring made of an electrically conducting material that extends concentrically about each annular electrode and that forms a closed annular space between it and the housing and comprises a hardened filling compound that fills the annular space.

Due to the filling compound, the natural oscillations and the resonant sharpnesses, if any, are advantageously reduced in a surprisingly simple manner, which might be due to the filling compound acting as a sound absorber.

When in one useful design the filling compound and the shape of the annular space are selected such that the characteristic acoustic impedance is matched to the electrooptical element, the result is a maximum reduction in the natural oscillations, which is an additional advantage.

~~Additional useful designs and further developments are characterized in the subordinate claims.~~

One exemplary embodiment of the invention is described in greater detail in the following using the drawings.

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Brief Description of the Drawings

Figure 1 is a schematic section of an electrooptical element; and

Figure 2 is a ~~section~~ sectional view taken along the line II-II ~~in accordance~~ with Figure 1.

Description of the Preferred Embodiments

The electrooptical element in accordance with Figure 1 has a housing 5 with a crystal 4 arranged therein in the form of a vertical circular cylinder and is intended for use in a transverse EOM, e.g. a Pockels cell. Its two cover surfaces act as a front plane for the entry of an entering light beam and as a parallel exit plane 41 for the light beam arranged at a distance therefrom. An annular electrode 1 is placed against the cover surfaces.

A holder for these parts (1, 4) is provided between the housing 5 on the one side and both the lateral surface of the crystal 4 and the two annular electrodes 1 on the other side, which are provided with a connection 7.

This holder has an O-ring 2 made of an electrically conducting material that extends concentrically about each annular electrode 1 and that forms a closed annular space between it and the housing. Furthermore, the case of the housing 5 is provided with a fill aperture 6 via which a filling compound made of plastic can be filled in the

annular space so that it completely fills the annular space and then hardens. In this manner the crystal 4 and parts of the two annular electrodes 1, if these are not already held by the O-ring, are fixed in the housing 5.

The natural oscillations of the crystals can be effectively dampened by selecting the shape of the annular space and the plastic. Resins, epoxies, lacquers, waxes, thermoplastics, elastomers, duromers, and/or acrylates can be considered for the plastics.